

ARTIFACT IN THE "ESSENCE OF HYPNOSIS": AN EVALUATION OF TRANCE LOGIC¹

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In Phase I of the investigation, 70 Ss were assigned to one of three treatment conditions: hypnotic induction, instructions to simulate hypnosis, or imagination control. All Ss were assessed on Orne's two indexes of trance logic (the transparent hallucination and the double hallucination). The imagination controls consistently showed trance logic as often as the hypnotic Ss. Depending upon the stringency of the criterion for hallucination, the simulating Ss showed trance logic less often, as often, or more often than the hypnotic Ss and the imagination controls. In Phase II of the investigation, simulating Ss consistently manifested trance logic as often as highly selected "sommambulist" hypnotic Ss. Since trance logic was not found to be a discriminating characteristic of hypnotic Ss, investigators who seek the "essence of hypnosis" must now search elsewhere.

In an often-quoted paper, Orne (1959) concluded that the most reliable criterion of the hypnotic state is *trance logic*, the ability of the hypnotic S to tolerate logical inconsistencies. This conclusion has been accepted and incorporated into textbooks and articles on hypnosis (e.g., Evans, 1968; Hilgard, 1962, 1965; Moss, 1965; Reyher, 1968; Wachtel, 1969), and the notion of trance logic has been assimilated into the mainstream of general psychology (e.g., Neisser, 1967; Sternbach, 1968). Despite this widespread acceptance, there are at least three reasons why Orne's conclusion concerning the relationship of trance logic to the hypnotic state can be viewed as a hypothesis in need of experimental verification.

1. Orne's (1959) conclusion was not derived from a formal experiment. It was derived from unsystematic observations that were presented in an anecdotal fashion.

2. Orne observed that trance logic was more frequent in (a) a group of selected high-

suggestible Ss who had received training in responding to hypnotic suggestions and who were instructed to enter hypnosis than in (b) a group of selected low-suggestible Ss who did not receive training in responding to suggestions and who were instructed to simulate or act as if they were in hypnosis. The comparison between these two groups confounded three antecedent variables: preexisting differences in suggestibility; differences in training to respond to suggestions; and differences in instructions. Since any one of these three confounded variables could have produced the higher frequency of trance logic in Orne's "real" hypnotic Ss than in his simulating Ss, no conclusions can be drawn concerning the relationship between trance logic and hypnosis.

3. No experiment has as yet been published in which there was an attempt to cross-validate Orne's original observations.

In this paper, we present an investigation that was designed to test the trance-logic hypothesis. Before presenting our investigation, it is necessary to describe Orne's two indexes or behavioral referents for trance logic, namely, the *transparent hallucination* and the *double hallucination*.

The Transparent Hallucination

Orne (1959) considered the first referent of trance logic to be S's spontaneous report that

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an induced hallucination is transparent. He described this referent as follows:

A good example of this process [of trance logic] is the reaction of many Ss in hypnosis who see a hallucination of a person sitting in a chair and describe it as "This is very peculiar, I can see Joe sitting in the chair and I can see the chair through him." This type of reaction, when made spontaneously, was absolutely diagnostic of the "real" [hypnotic] S [p. 295].

Although Orne reported that the transparent hallucination did not occur spontaneously in all hypnotic Ss, he reported that it *never* occurred in simulating Ss who were asked to fake a hypnotic trance.

The Double Hallucination

The second referent of trance logic is S's report that he sees a person in front of him who is, at the same time, also behind him. Orne (1959) described the procedure for inducing this double hallucination as follows:

At the beginning of the experiment [an associate of the experimenter]—sat to the side of the S, well within his visual field. Once the S's eyes were closed, the [associate] rose very silently and walked behind the S out of the S's visual field. Subsequently, the S was instructed to open his eyes while still in deep trance and a hallucination of the associate sitting in the chair was induced. . . . After the hallucination appeared to be fully accepted by the S . . . he was instructed to turn around and look at the associate now behind him with the question, "Who is that behind you?" Almost invariably the "real" [hypnotic] S would look at the associate, then quickly turn back to look at the empty chair, and back at the associate. After [performing a "double take," that is after] looking back and forth between the hallucinated and the "real" associate, the Ss indicated verbally that they were perceiving two images of the same person. When asked about this, they tended to give bland responses such as "mirrors" or a "trick" [p. 296].

Orne (1959) stated that "real" hypnotic Ss "almost invariably" showed the double hallucination response, whereas "Of approximately 30 'faking' Ss, only two acted as if they saw two images of the same individual [p. 296]." The remaining simulators either refused to see the associate behind them, claimed that they did not recognize the associate who was behind them, or claimed that the hallucination had vanished.

On the basis of these observations pertaining to the transparent hallucination and the double hallucination, Orne (1959) in-

ferred that (a) simulators reason logically (e.g., the same person cannot be in two places at the same time); while (b) real hypnotic Ss freely mix subjective reality (e.g., the hallucination of a person) with objective reality (e.g., the perception of the actual person) "without any apparent attempts to satisfy a need for logical consistency [p. 295]." These inferences, and several related inferences, were evaluated in the two phases of the investigation described as follows.

PHASE I

This phase of the investigation was designed to evaluate the separate effects of the three variables that were confounded in Orne's two comparison groups (real hypnotic Ss versus simulating Ss); namely, differences in preexisting suggestibility, differences in previous training in hypnosis and in responding to suggestions, and differences in instructions. The design of the experiment is presented in Table 1. It should be noted that Ss within each treatment condition are subdivided into those who are high and those who are low on preexisting suggestibility, and that one group of high-suggestible Ss (Group 1A) received training in hypnosis and in responding to suggestions. A comparison of the responses of Ss in Group 1A and 1 permits an evaluation of the added effect of training on trance logic among high-suggestible hypnotic Ss.

In addition to assessing the separate effects of preexisting suggestibility and prior training, the experiment also assessed the effects of the following three treatment conditions (see Table 1): (a) Hypnosis—Groups 1A, 1, and 2 were exposed to a standardized hypnotic-

TABLE 1
EXPERIMENTAL DESIGN

Level of suggestibility	Treatment condition		
	Hypnotic induction (real)	Hypnotic induction (simulation)	Imagination control
High suggestible (with training)	Group 1A		
High suggestible	Group 1	Group 3	Group 5
Low suggestible	Group 2	Group 4	Group 6

Note.—*n* = 10 per cell; *N* = 70.

induction procedure with instructions to really feel the things suggested. (b) Simulation—Groups 3 and 4 were also exposed to the hypnotic-induction procedure but these Ss were told, beforehand, to simulate—not to really feel the things suggested, not to be hypnotized, but to act as if they were hypnotized. (c) Imagination control—The Ss in Groups 5 and 6 were merely told that they were to take a test of imagination and were not exposed to the hypnotic-induction procedure.

Method

*Subjects and Procedure*³

The Ss were 70 female student nurses at the Medfield State Hospital, Harding, Massachusetts, who volunteered to participate in the experiments when they were told they would be paid \$3. The mean age for the group was 20 yr., with a range of 19–26 yr. None had previously served as experimental Ss.

In a preliminary group session, the 70 student nurses were exposed, by means of a tape recording, to the 12-point Harvard Group Scale of Hypnotic Susceptibility (Shor & Orne, 1962). Those who scored between 7 and 12 were considered high suggestible, while those who scored between 0 and 6 were considered low suggestible. The mean Harvard Group Scale scores for the high- and low-suggestible groups were 9.1 and 4.2, respectively. The high suggestibles were randomly assigned to Groups 1A, 1, 3, and 5, with 10 Ss per group. The low-suggestible Ss were randomly assigned to Groups 2, 4, and 6, with 10 Ss per group.

Subsequently, each S was tested individually. Each S was met by a role instructor who informed her of the treatment condition that she was to receive. The role instructor then brought S to the experimental room and left. This procedure was followed in order to keep E "blind" with respect to which set of instructions (real or simulation) S had received. Upon arrival in the experimental room, S sat beside E and faced E's assistant. The assistant began the session by asking S biographical questions (e.g., name, age, and number of brothers and sisters).

Hypnotic Induction Groups 1 and 2 (real hypnotic Ss). Prior to being brought to the experimental room, each S assigned to this treatment condition was told by the role instructor that she was going to be hypnotized. After S was seated in the experimental room (and the role instructor had left), S answered the biographical questions that were asked by the assistant, and then E administered a 10-min. hypnotic-induction procedure consisting of repeated suggestions of re-

laxation, drowsiness, sleep, and hypnosis. The hypnotic-induction procedure was adapted from the Harvard Group Scale and is found in Johnson (1970).

Hypnotic Training Group 1A. Prior to the experimental session, each S assigned to this group received extensive training in responding to a variety of hypnotic suggestions: suggestions for ideomotor responses, challenge suggestions, negative and positive auditory and visual hallucinations, analgesia, catalepsy, age regression, taste hallucination, anosmia, and post-hypnotic response. Where possible, the person who trained these Ss⁴ used verbatim protocols from the Stanford Hypnotic Susceptibility Scale, Form C (Weitzenhoffer & Hilgard, 1962). At the conclusion of the training, S was given an appointment to meet the role instructor. From this point on, Ss in Group 1A were treated in the same way as Ss in Groups 1 and 2.

Hypnotic Induction Groups 3 and 4 (simulators). Prior to being brought to the experimental room, each S assigned to this treatment condition was told by the role instructor that she was *not* to be hypnotized but that her task was to fool E into believing that she was hypnotized. The S was also told that she was to continue faking—acting as if she was hypnotized—until E expressly stated that the experiment was over. These instructions to simulate were the same as those used by Orne (1957, 1959). After S entered the experimental room and answered the assistant's questions, E administered the identical hypnotic-induction procedure that was given to the real hypnotic Ss of Groups 1A, 1, and 2. Thus, aside from the instructions to simulate hypnosis which were given by the role instructor, Ss in Groups 3 and 4 were treated the same as the real hypnotic Ss.

Imagination Control Groups 5 and 6. Prior to being brought to the experimental room, each S assigned to this treatment condition was told by the role instructor that she would not be hypnotized but that she would be given a test of imagination. After S entered the experimental room and answered the biographical questions, E administered instructions designed to motivate S to perform to the best of her ability on the forthcoming "tests of imagination." These instructions conveyed to S that she was part of a "very important control group for a large experiment"; if she really concentrated to the best of her ability, she would perform well on the tasks; other students found it easy to do these things when they tried; and she should just "let things happen." The S was then asked to seat herself comfortably and close her eyes.

Assessment of Trance Logic (Dependent Variables)

An attempt was made to replicate as closely as possible Orne's (1957, 1959) procedures for the measurement of the transparent and double hallucinations. After administration of one of the three treatment conditions (hypnotic induction, instructions to simu-

³ Orne's (1957) doctoral dissertation contains more procedural details than the paper (Orne, 1959) which was derived from it. Both reports—Orne's (1959) paper and his more detailed dissertation—were used in formulating the procedures for the present investigation. The authors thank M. T. Orne for the loan of films depicting the elicitation of trance logic.

⁴ The trainer constituted the fourth member of the experimental team. Of the four (role instructor, trainer, E, and E's assistant), only the role instructor knew the identity of the simulators.

late hypnosis followed by hypnotic induction, or imagination control), *S* was given "warm-up" suggestions derived from the Barber Suggestibility Scale (Barber, 1965) and from Orne's (1957) dissertation—arm lowering, hand levitation, hand clasp, thirst hallucination, verbal inhibition, body immobility, and visual hallucination. Immediately after the visual hallucination item, *E* asked *S* to close her eyes and jotted down his first guess as to whether or not *S* was a simulator. The assistant then quietly moved to a position behind *S* and out of her field of view.

The transparent hallucination. Immediately after the assistant had moved to a position behind *S*, *E* said:

Now in a moment, I am going to ask you to open your eyes again. This time, when you open them, you will see Joe [the assistant] sitting in front of you. You remember Joe. He was the one who asked you some questions at the beginning of this session. You will see him sitting in the chair in front of you. All right, open your eyes. Describe Joe for me. What does he look like? What is he doing?

The *S*'s responses were recorded. The *S* was considered to have fully accepted the suggestion to hallucinate (stringent criterion for hallucination) if she responded as if he were really there, if she said that she saw the assistant in the chair, described his appearance, and reported what he was doing. The *E* noted whether these *S*s, who fully accepted the suggestion to hallucinate, reported *spontaneously* that they could see the back of the chair through the image of the assistant. If *S* did not report this, *E* asked the following neutrally worded question: "Do you, or do you not, see the back of the chair through Joe?" The *S*'s response was recorded.

The *S*s who did not hallucinate when given the above suggestions were told to close their eyes and then were given the following additional suggestions:

Now in a moment I am going to ask you to open your eyes. When you open them, I want you to imagine that Joe is seated in the chair in front of you. Vividly imagine him there. Do the best that you possibly can. Visualize him vividly and clearly to the best of your ability. All right, when you open your eyes you will see him sitting in the chair in front of you. Open your eyes. Describe Joe for me. What is he doing?

Those *S*s who had failed to meet the stringent criterion for hallucination did "hallucinate" when they were given instructions to imagine (i.e., they met a liberal criterion for "hallucination"). The *E* also noted whether these *S*s *spontaneously* reported that they could see the back of the chair through the image of the assistant. If they did not report spontaneously, they were also asked, "Do you, or do you not, see the back of the chair through Joe?"

The double hallucination. Immediately after the test for the transparent hallucination, the double hallucination was tested with all *S*s as follows: The *E* pointed to the assistant who was behind *S* and said to *S*, "All right, now turn around and tell me—Who is that behind you?" After *E* had recorded *S*'s response, he

pointed to the chair where *S* had hallucinated the assistant and said, "All right, look straight ahead again, and tell me—Who is this in front of you?" If *S* reported a double hallucination (if she stated that she saw the assistant behind her and also in front of her), *E* noted if *S* did a "double take," that is, if *S* looked back and forth at the hallucinated and the real assistant, and asked *S*, "How do you explain this?"⁶ The *E* then stated:

All right, you can close your eyes now. Remain deeply relaxed and pay close attention to what I am going to say. In a moment I am going to count backwards from 5 to 1. By the time I reach 1 your eyes will be wide open, and you will be fully awake and refreshed. Five, 4, 3, 2, 1. Wide awake, fully awake!

(The *S*s in Imagination Groups 5 and 6 were simply told, "Open your eyes. You can stop imagining.")⁶

The *S* was then told that the experiment was *not* yet over, that there were a few questions to be asked. Where appropriate, *E* asked *S* how she explained seeing the assistant in front of her and behind her at the same time and how she explained seeing the chair through the assistant. At the conclusion of this inquiry, *E* recorded his second guess as to whether or not he thought *S* was simulating. (The *E* did not discriminate the simulators from the real hypnotic *S*s at better than a chance level on either his first or second guess; see Johnson, 1970). The *E* then stated, "The experiment is officially over now. Did you receive any special instructions before you were brought down here?" If *S* replied "No," *E* paid her \$3, admonished her not to tell anyone what the experiment was about, and terminated the experiment. However, if *S* stated that she had been instructed to simulate, she was asked to elaborate on her experiences while playing this role. At the conclusion of this inquiry, *E* paid *S* and terminated the experiment.

⁵ Immediately after the double hallucination was assessed, all *S*s were tested on the "missing watch hand" item of Weitzenhoffer and Hilgard (1963). Hilgard (1965) had contended that this item is a measure of trance logic and that it differentiates hypnotic *S*s from controls. In the present study, the missing watch hand response occurred only three times, once in the low-suggestible simulator group (Group 4) and once each in Groups 1 and 1A. Since the missing watch hand response was very infrequent, and when found was exhibited by low-suggestible simulators as well as by high-suggestible hypnotic *S*s, no further comment will be made.

⁶ Orne (1966) had previously related spontaneous amnesia to trance logic. Therefore, at this point *S*s were tested for spontaneous amnesia. Of the 10 cases of amnesia observed, 9 were simulators. These data confirmed earlier findings indicating that spontaneous amnesia is a rare occurrence among hypnotic *S*s (Barber, 1969; Hilgard, 1965). Since these new data simply indicate that simulators *think* hypnotic *S*s forget spontaneously (which they do not), no further comment is warranted.

TABLE 2

PERCENTAGE OF SUBJECTS MEETING TRANSPARENT
OR DOUBLE HALLUCINATION INDEXES
OF TRANCE LOGIC

Level of suggestibility	Treatment condition		
	Hypnotic induction (real)	Hypnotic induction (simulation)	Imagination control
	Transparent hallucination index of trance logic		
High suggestible (with training)	60% (Group 1A)		
High suggestible	70% (Group 1)	30% (Group 3)	80% (Group 5)
Low suggestible	90% (Group 2)	30% (Group 4)	60% (Group 6)
	Double hallucination index of trance logic		
High suggestible (with training)	30% (Group 1A)		
High suggestible	30% (Group 1)	40% (Group 3)	10% (Group 5)
Low suggestible	20% (Group 2)	40% (Group 4)	30% (Group 6)

Note.—In this table, all Ss are taken into consideration regardless of whether or not they met the stringent or the liberal criterion for hallucination.

Results

*All subjects.*⁷ The reader will recall that (a) in order for *S* to exhibit trance logic, she must first hallucinate the assistant; and (b) some Ss met a stringent criterion for hallucination (hallucinated the assistant when they were first given direct suggestions to do so) and the remaining Ss met a liberal criterion ("hallucinated" the assistant when they were given additional suggestions to imagine). The first results presented were obtained with *all* of the Ss (regardless of whether they met the liberal or stringent criterion), and next the results obtained with Ss who met the stringent criterion are presented.

As Table 1 shows, there are six groups (1-6) that fall into a 2×3 table. Within these six groups, each measure of trance logic (the transparent hallucination and the double hallucination) was assessed by means of an extension of the chi-square analysis of contingency tables (Castellan, 1965). This analysis is analogous to an analysis of variance for

interval data. The effects of preexisting suggestibility and treatment conditions were evaluated by this extension of the chi-square analysis. The added effect of *training in hypnosis* was assessed by comparing the responses of Ss who received training (Group 1A) with the comparable Ss who did not receive training (Group 1); this was accomplished by means of Fisher's exact probability test for a 2×2 contingency table (Siegel, 1956).

The transparent hallucination. Not one of the 70 Ss spontaneously reported that she could see the back of the chair through the hallucination of the assistant. Consequently, the hypothesis that hypnotic Ss are more likely to report *spontaneously* that an induced hallucination is transparent cannot be accepted at the present time; the phenomenon simply was not observed.

When *E* questioned *S* concerning the transparency of the image of the assistant, the transparent hallucination referent of trance logic was found in at least 30% of Ss in all groups (see Table 2). However, if one examines the six groups of untrained Ss (overall $\chi^2 = 11.67$, $df = 2$, $p < .01$) it is evident that (a) the real hypnotic Ss (Groups 1 and 2) did not differ from the imagination controls (Groups 5 and 6) with respect to the transparent hallucination ($\chi^2 = .42$, $df = 1$, $p > .50$); and (b) *both* the real hypnotic Ss and the imagination controls differed significantly from the simulators (Groups 3 and 4) ($\chi^2 = 11.25$, $df = 1$, $p < .001$). The simulators displayed the transparent hallucination less frequently than the real hypnotic Ss or the imagination controls. Hypnotic training did not increase the frequency of the transparent hallucination: 60% of the *trained* real hypnotic Ss of Group 1A and 70% of the *nontrained* real hypnotic Ss of Group 1 exhibited the transparent hallucination ($p = .50$, Fisher's exact test). Levels of suggestibility also did not differentiate Ss with respect to this dependent variable: 60% of the low-suggestible Ss (Groups 2, 4, and 6) and 60% of the high-suggestible Ss (Groups 1, 3, and 5) showed the transparent hallucination.

The double hallucination. The bottom part of Table 2 displays the percentage of Ss in each group who reported that they saw the assistant in front of them and also behind them

⁷ Details of the statistical analyses presented in this paper together with additional analyses that were performed are presented in Johnson (1970).

at the same time. The real hypnotic Ss (Groups 1 and 2), the simulators (Groups 3 and 4), and the imagination controls (Groups 5 and 6) showed the double hallucination response equally often (overall $\chi^2 = 2.13$, $df = 2$, $p > .30$). Consequently, the hypothesis that hypnotic Ss, as opposed to comparable simulating Ss or imagination control Ss, more often report seeing two simultaneous images of the same person cannot be accepted. In accordance with Orne's (1959) report, most simulators refused to say that they saw the person behind them, claimed that the hallucination had disappeared, etc. However, in the present investigation, most hypnotic Ss and imagination controls also proffered statements of this type.

With regard to the added effect of training in hypnosis among high-suggestible Ss, it was found that an equal number (30%) of trained hypnotic Ss (Group 1A) and nontrained hypnotic Ss (Group 1) exhibited the double hallucination. Also, high-suggestible Ss did not differ from low-suggestible Ss on this dependent variable ($\chi^2 = .08$, $df = 1$, $p > .70$).

Stringent criterion for hallucination. The following procedure was used to analyze the data in terms of a stringent criterion for hallucination: (a) those Ss who required the extra suggestions (which emphasized "imagining") to induce the "hallucination" were scored as *not* exhibiting the transparent and double hallucinations no matter what their responses may have been; and (b) only those Ss who *fully accepted* the initial direct suggestion to hallucinate were considered eligible to pass the transparent and double hallucination tests. The S was considered to have fully accepted the initial suggestion to hallucinate if she responded as if she actually saw the (hallucinated) assistant in the chair, that is, if she stated that she saw him, described his appearance, and described what he was doing.

When the data were recast in terms of this stringent criterion for hallucination (see Table 3), there was a tendency for the imagination control Ss to pass the transparent hallucination test less often than the hypnotic Ss or the simulating Ss; however, this trend failed to reach statistical significance (overall $\chi^2 = 3.12$, $df = 2$, $p > .20$). Also, there was a tendency for the high-suggestible Ss

TABLE 3
PERCENTAGE OF SUBJECTS MEETING TRANSPARENT OR DOUBLE HALLUCINATION INDEXES OF TRANCE LOGIC (UTILIZING A STRINGENT CRITERION FOR HALLUCINATION)

Level of suggestibility	Treatment condition		
	Hypnotic induction (real)	Hypnotic induction (simulation)	Imagination control
Transparent hallucination index of trance logic			
High suggestible (with training)	0% (Group 1A)		
High suggestible	40% (Group 1)	20% (Group 3)	10% (Group 5)
Low suggestible	10% (Group 2)	20% (Group 4)	0% (Group 6)
Double hallucination index of trance logic			
High suggestible (with training)	10% (Group 1A)		
High suggestible	20% (Group 1)	30% (Group 3)	0% (Group 5)
Low suggestible	10% (Group 2)	40% (Group 4)	0% (Group 6)

(Groups 1, 3, and 5) to pass the transparent hallucination test more often than the low-suggestible Ss (Groups 2, 4, and 6); however, this trend also failed to reach statistical significance ($\chi^2 = 1.92$, $df = 1$, $p > .10$). Surprisingly, the *untrained* high-suggestible hypnotic Ss (Group 1) passed the transparent hallucination test more often than the *trained* high-suggestible hypnotic Ss (Group 1A) ($p = .04$, Fisher's exact test).

With respect to the double hallucination, the bottom part of Table 3 shows the percentage of Ss in each group who reported seeing the assistant simultaneously in front of them and also behind them (overall $\chi^2 = 8.88$, $df = 2$, $p < .02$). Examination of the six groups of untrained Ss shows that (a) the simulators (Groups 3 and 4) displayed trance logic, as indexed by the double hallucination, *more* frequently than either the nontrained real hypnotic Ss (Groups 1 and 2) or the imagination controls (Groups 5 and 6) ($\chi^2 = 7.26$, $df = 1$, $p < .01$) while (b) these latter two groups did not differ ($\chi^2 = 1.62$, $df = 1$, $p = ns$). Once again, levels of suggestibility did not differentiate Ss on this dependent variable (five high-suggestible and five low-suggestible Ss now showed the double hal-

lucination). Also, only one of the trained hypnotic Ss (Group 1A) and two of the non-trained hypnotic Ss (Group 1) exhibited the double hallucination ($p = .50$, Fisher's exact test). Consequently, with the data recast in terms of the stringent criterion for hallucination, the hypothesis that hypnotic Ss as opposed to comparable simulators or imagination controls exhibit more trance logic (report more often that the hallucination is transparent or double) is once again rejected.

The results of Phase I of this investigation indicate that high- and low-suggestible Ss cannot be differentiated with respect to either of Orne's (1959) indexes of trance logic (the transparent and double hallucination). However, it should be noted that the high-suggestible hypnotic Ss who participated in Phase I had typically scored around 9 points on the 12-point Harvard Group Scale of Hypnotic Susceptibility. Although these Ss were *relatively* high on suggestibility, they had typically failed about 3 of the test suggestions on the Harvard Group Scale and thus cannot be considered as "somnambules," that is, as extremely high-suggestible hypnotic Ss who pass practically all test suggestions. To determine whether Orne's hypothesis concerning the relationship between hypnosis and trance logic is valid when "somnambulistic" hypnotic Ss are used, we carried out Phase II of this investigation.

PHASE II

From a population of about 200 nurses who had participated in our earlier experiments in hypnosis, but who had not participated in Phase I of the present investigation, 5 were selected who had met criteria for "somnambulism," that is, who had passed all test suggestions. To reconfirm their excellence as hypnotic Ss, each was tested on the Diagnostic Rating Scale of Hypnotizability (Orne & O'Connell, 1967). Possible ratings on this clinically derived scale range from 1 (totally unresponsive) to 5+ (responsive to even the most difficult suggestions). All 5 of these selected Ss scored either 5 or 5+ on the Diagnostic Rating Scale of Hypnotizability. Orne and O'Connell reported that Ss who obtain scores of 5 or 5+ on the Diagnostic

Rating Scale of Hypnotizability fall within the upper 1% to 2% of the population.

After we had verified that the 5 Ss were excellent hypnotic Ss (somnambules), each S participated individually in a formal experimental session. The treatment condition for each of these Ss was the same as the hypnotic induction (real) treatment that was described in Phase I of this investigation.

To obtain a comparable group of Ss to be used as simulators, 44 previously untested student nurses were administered the Harvard Group Scale of Hypnotic Susceptibility. Six of these Ss, who obtained the top scores of either 11 or 12 on the Harvard Group Scale, were subsequently tested individually under a hypnotic induction (simulation) treatment condition as described in Phase I.

Results

When the data from this phase of the investigation were analyzed in terms of the liberal criterion for hallucination, the results were as follows: (a) *none* of the real hypnotic Ss and *none* of the simulators exhibited the transparent hallucination spontaneously; (b) when directly asked about the transparency of the hallucination, three of the five real hypnotic Ss (60%) and three of the six simulators (50%) testified that they could see the back of the chair through the hallucination of the assistant; and (c) the double hallucination response was given by three of the five real hypnotic Ss (60%) and four of the six simulators (67%). In basic agreement with the results of Phase I, these results of Phase II indicate that when a liberal criterion for hallucination is used, extremely high-suggestible hypnotic Ss (somnambules) do not manifest trance logic (as indexed by the transparent and double hallucinations) appreciably more often than a comparable group of simulators.

The data for Phase II also did *not* support the trance logic hypothesis when they were recast in terms of the stringent criterion for hallucination: There was absolutely no change with respect to the results for the double hallucination, and only one less real hypnotic S and one less simulator showed the transparent hallucination.

DISCUSSION

The hypothesis that trance logic is a discriminating characteristic of hypnotic Ss is not supported by the data from either Phase I or Phase II of this investigation.

Transparent Hallucination

Reports of transparent hallucinations were never made *spontaneously* by any S. When Ss were specifically asked about the transparency of the hallucination, the results did not differentiate hypnotic Ss from imagination control Ss. The only statistically significant finding that was consistent with Orne's original observations was that when a liberal criterion for hallucination was used in Phase I, simulators reported fewer transparent hallucinations than hypnotic Ss (or imagination control Ss). However, when a stringent criterion for hallucination was used in Phase I, simulators reported the transparent hallucination as often as hypnotic Ss (or imagination control Ss). Also, in Phase II of the investigation, simulating Ss did not differ from somnambulist hypnotic Ss on the transparent hallucination.

Double Hallucination

When using a liberal criterion for "hallucination" in Phase I, the double hallucination referent of trance logic was found as often among simulating Ss, imagination control Ss, and hypnotic Ss. When using the stringent criterion for hallucination in Phase I, the simulators displayed trance logic, as indexed by the double hallucination, *more frequently* than the imagination control Ss or the hypnotic Ss. However, in Phase II of the investigation, the simulators did not differ from the "somnambulist" hypnotic Ss on the double hallucination. Also, as was the case with the transparent hallucination, the double hallucination bore no systematic relationship to hypnotic training or to various levels of responsiveness to hypnotic suggestions.

With regard to the double hallucination referent of trance logic, Orne (1959) reported that real hypnotic Ss (a) performed a "double take" (looked back and forth between the hallucinated and the "real" person) and (b) subsequently offered "bland" explanations such as "mirrors" or a "trick" to explain how

they perceived two images of the same person. In the present experiment, the "double-take" response and "bland" explanations were proffered by a small number of hypnotic Ss and also by an equally small number of simulating Ss and imagination control Ss (see Johnson, 1970).

In brief, in Phase I of the investigation, hypnotic Ss did not differ significantly from imagination control Ss on any of the indexes of trance logic. Also, in Phase II, somnambulist hypnotic Ss did not differ from simulating Ss on any of the indexes of trance logic. Although, in Phase I, the simulators differed from both the hypnotic Ss and the imagination control Ss on some of the dependent measures, these differences did not support Orne's hypothesis that hypnotic Ss characteristically display trance logic. For instance, when using the liberal criterion for hallucination, the simulators more often reported that the hallucination was solid rather than transparent. This outcome seems to indicate simply that simulators (wrongly) believe that hypnotic Ss see solid hallucinations. (The results of the present investigation and of Orne's original report indicate that most hypnotic Ss do not report solid hallucinations.)

CONCLUSION

Regardless of whether a liberal or a stringent criterion for hallucination is used, and regardless of whether low-suggestible Ss, high-suggestible Ss, or extremely high-suggestible Ss (somnambules) are used, the data do not support the hypothesis that hypnotic Ss characteristically display trance logic.

Since trance logic is not a discriminating characteristic of hypnotic Ss, investigators who seek the essence of hypnosis must now search elsewhere. A hard lesson has been learned, however. It is apparent that in hypnosis research, failure to use adequate controls can lead to unwarranted inferences about the characteristics of hypnotic Ss. In the future, if hypnotic Ss are compared with simulating Ss, we suggest that a third group, consisting of imagination control Ss, should also be used for comparison. With the appropriate use of this additional group of Ss, one may avoid the pitfall of labeling something unique to hypnotic Ss, which in reality

may be an artifact due to the unusual behavior of simulating Ss.

Furthermore, available evidence suggests that the search for the "essence of hypnosis" cannot be undertaken optimistically. Just as the present investigation shows that trance logic is not characteristic of hypnotic Ss, recent experiments, summarized elsewhere (Barber, 1969, 1970a, 1970b), have shown that other phenomena that have been regarded as characteristic of hypnotic Ss, such as testimony that hypnosis is experienced as basically different from the waking state or reports of a compulsion to follow the suggestions of the hypnotist (Orne, 1959), also do not hold up when adequate experimental designs are employed. Although it appears extremely difficult to find an essence of hypnosis, it can be rather easily demonstrated that the overt behaviors and subjective reports that have been historically subsumed under the term *hypnotism* are functionally related to denotable antecedent variables (Chaves, 1968; Spanos, 1970; Spanos & Chaves, 1970).

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